CLAIMS

1.   A method of performing an adaptive filter operation on an input data sample to generate an output data sample, where a logical computation is performed on a logical data item to determine whether a filtering computation should be applied to the input data sample, the method comprising the steps of:

(a)   transforming the logical computation into an equivalent logical computation that incorporates the filtering computation;

(b)   storing the input data sample and the logical data item within a data word;

(c)   employing a data processing unit to apply the filtering computation to the data word, resulting in the data word containing a filtered data sample and a modified logical data item;

(d)   comparing the modified logical data item with predetermined criteria; and

(e)   outputting as the output data sample either the input data sample or a data sample derived from the filtered data sample, dependent on the comparison at said step (d).

2.   A method as claimed in Claim 1, wherein at said step (b) a plurality of input data samples and corresponding logical data items are stored within the data word, whereby at said step (c) the filtering computation is applied simultaneously to a plurality of input data samples.

3.   A method as claimed in Claim 2, wherein said steps (d) and (e) are performed independently for each data sample.

4.   A method as claimed in Claim 1, wherein the predetermined criteria employed at said step (d) are the maximum and minimum values that the modified logical data item may take, the data sample derived from the filtered data sample being output at said step (e) if the corresponding logical data item has either the maximum or minimum value.

5.   A method as claimed in Claim 1, wherein at said step (b) the input data sample and corresponding logical data item are spaced apart from each other in the data word by

a predetermined number of bits to allow for their values to increase during application of the filtering computation without interacting with each other.

5   6.   A method as claimed in Claim 1, wherein the filtering computation involves application of a predetermined Finite Impulse Response (FIR) filter to the data word to generate for each input data sample a filtered data sample equivalent to the accumulation of that input data sample and adjacent data samples each multiplied by a predetermined integer coefficient.

10   7.   A method as claimed in Claim 6, wherein if at said step (d) it is determined that the filtered data sample should be used to form the output data sample, then said step (e) includes the step of generating the data sample derived from the filtered data sample by dividing the filtered data sample by a predetermined factor to correct for the use of integer coefficients in the filtering computation.

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8.   A method as claimed in Claim 6, wherein the FIR filter is formed by a plurality of cascaded filters which are applied one after the other to the data word.

9.   A method as claimed in Claim 1, wherein the adaptive filter operation is applied
20   as part of an image processing application, each input data sample representing data of an image pixel.

10.   A method as claimed in Claim 9, wherein the adaptive filter operation is used to perform deringing of a decompressed image to reduce compression artefacts.

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11.   A method as claimed in Claim 10, wherein the adaptive filter operation is used to perform deringing of an MPEG-4 decompressed image, the logical data item for each input data sample being an index value generated by comparing the input data sample with a predetermined threshold value, the index value being set to a first or a second logic
30   value dependent on the comparison.

12.   A method as claimed in Claim 11, wherein the data word is 32 bits long, each input data sample is 8 bits long, and each index value is 1 bit long, said step (b) comprising the storing of a first and second input data sample and their corresponding index values within the 32 bit data word, and wherein each input data sample is spaced apart from its corresponding index value in the data word by four spacing bits, with three spacing bits separating the index value of the first input data sample from the second input data sample stored in the data word.

13.   A method as claimed in Claim 12, wherein the spacing bits have a known value.

14.   A method as claimed in Claim 12, wherein the filtering computation involves application of a predetermined Finite Impulse Response (FIR) filter to the data word to generate for each input data sample a filtered data sample equivalent to the accumulation of that input data sample and adjacent data samples each multiplied by a predetermined integer coefficient, and wherein the integer coefficients used in the filtering computation are such that the filtered data samples and modified logical data items may be up to a factor of sixteen times larger than the corresponding input data samples and logical data items, the method further comprising the step of, if it is determined at said step (d) that the filtered data sample produced from the first input data sample should be output, applying an operation to correct the filtered data sample produced from the second input data sample if the modified logical data item corresponding to the first input data sample has its maximum value.

15.   A data processing apparatus for performing an adaptive filter operation on an input data sample to generate an output data sample, where a logical computation is performed on a logical data item to determine whether a filtering computation should be applied to the input data sample, the logical computation being transformed into an equivalent logical computation that incorporates the filtering computation, the apparatus comprising:

        a storage for storing a data word containing the input data sample and the logical data item;

        a data processing unit for applying a sequence of data processing operations to:

(i) construct the data word containing the input data sample and the logical data item;

(ii) apply the filtering computation to the data word, resulting in the data word containing a filtered data sample and a modified logical data item;

5   (iii) compare the modified logical data item with predetermined criteria; and

(iv) output as the output data sample either the input data sample or a data sample derived from the filtered data sample, dependent on the comparison at said step (iii).

10   16.   A computer program operable to configure a data processing apparatus to perform a method as claimed in Claim 1.

17.   A carrier medium comprising a computer program as claimed in Claim 16.

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